The dead at Escoural Cave (Montemor-o-Novo, Portugal): early farmer's interactions in south-western Iberian Peninsula

Os mortos na Gruta do Escoural (Montemor-o-Novo, Portugal): interações nas primeiras sociedades camponesas do sudoeste da Península Ibérica

Rita Peyroteo-Stjerna
rita.peyroteo.stjerna@ebc.uu.se
Human Evolution, Department of Organismal Biology, Uppsala University, Sweden
UNIARQ, Centro de Arqueologia da Universidade de Lisboa, Portugal

Ana Cristina Araújo
acaraujo@dgpc.pt
LARC, Laboratório de Arqueociências da DGPC
CIBIO/InBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos
UNIARQ, Centro de Arqueologia da Universidade de Lisboa, Portugal

Mariana Diniz
m.diniz@fl.ul.pt
UNIARQ, Centro de Arqueologia da Universidade de Lisboa, Portugal

ABSTRACT
The arrival of farmers to the south-western Iberian Peninsula was followed by a period of complex human interaction after 5500 BCE. This marked the arrival of new technologies and subsistence practices such as pottery, husbandry and domestication of plants, but also the co-existence of diverse social structures and world-views in a territory populated by hunter-gatherers.
Biological and sociocultural interactions between local and migrant groups at the onset and establishment of the Neolithic in Atlantic Europe are poorly understood. The Neolithic funerary context in the Escoural cave, Montemor-o-Novo, Portugal, offers a research opportunity to examine these processes because it is uniquely well preserved and its use intersects key periods to understand multi-layered human interaction.
In this paper we present a synthesis of what is known about the Neolithic use of the cave complemented by new observations in the scope of a multidisciplinary project centred on the Escoural Cave started in 2018.
KEY WORDS: Escoural Cave, Neolithic, Archaeology of Death, Archaeological Science

RESUMO
A entrada dos primeiros agricultores no SO da Península Ibérica, c. 5500 BCE, foi acompanhada pela introdução de novas tecnologias e formas de subsistência. As interacções que se estabeleceram entre grupos locais e migrantes nesta etapa do processo histórico, que marca o advento e a consolidação do Neolítico na Europa Atlântica, são mal conhecidas. O contexto funerário da Gruta do Escoural (Montemor-o-Novo) constitui uma oportunidade para investigar estes processos, não só devido ao seu grau de preservação, mas porque a sua utilização intercepta períodos-chave para a compreensão de múltiplos aspectos dessa interacção humana. Os materiais arqueológicos escavados na década de 1960 incluem restos humanos, artefactos em pedra e osso, cerâmicas e adornos. Apesar de a cultura material sugerir uma afiliação ao Neolítico Médio (c. 4500-3500 BCE), a datação de restos humanos sugere um intervalo de tempo mais tardio (c. 3500--3000 BCE), marcado pela construção de monumentos megalíticos na região. O cruzamento de culturas de cronologia neolítica no Escoural é igualmente apoiado por cerâmicas cardiais e impressas, sugerindo uma utilização da cavidade no Neolítico Antigo (c. 5500--4700 BCE).
Neste artigo apresentamos uma síntese dos dados conhecidos sobre a ocupação Neolítica da Gruta do Escoural, a par de novas observações realizadas no âmbito de um projeto iniciado em 2018 e centrado nesta cavidade. O objectivo deste projecto é implementar uma perspectiva interdisciplinar ao estudo da Arqueologia da Morte, investigando paralelamente as interacções humanas criadas com a introdução e consolidação de novas formas de vida na região (c. 5400-3000 BCE).
PALAVRAS-CHAVE: Gruta do Escoural, Neolítico, Arqueologia da Morte, Arqueociências

1. INTRODUCTION

The arrival of farmers to the south-western Iberian Peninsula was followed by a period of complex human interaction after 5500 BCE. This marked the arrival of new technologies and subsistence practices, such as pottery, husbandry and domestic plants, but also the co-existence of diverse social structures and world-views in a territory previously populated by hunter-gatherers. Also, recent studies suggest greater diversity among first farmers (DINIZ et al., 2016) adding layers of complexity to processes of sociocultural and biological interaction during the Neolithic in south-western Europe c. 5500 – 3000 BCE.

Interactions between early farmers, as well as between first farmers and the last hunter-gatherers during the establishment of new ways of living and world-views are poorly understood. In this paper we argue that the Neolithic funerary context in the Escoural Cave offers a research opportunity to examine these processes in south-western Europe, because this archaeological site is uniquely well preserved and its use intersects key periods to understand multilayered human interaction.

The Escoural Cave is located in southern Portugal in Montemor-o-Novo in the Alentejo region (Fig. 1). The site is unique in the landscape because: 1) it is the only karst system known in the interior of Alentejo; 2) it is located on the interface of two key regions for human settlement in west Iberia, i.e. the Tagus and the Sado palaeoestuaries in the north and west (the most important regions of Mesolithic settlement in Iberia), and the Évora plains in the south-east (one of the main landscapes of Iberian megalithism); 3) it is naturally protected and strategically located at the edge of the Monfurado mountain range with a privileged view over the surrounding plains; 4) it offers easy access to water, making it a favourable place for early populations.

Escoural is the most south-western cave in Europe with Palaeolithic rock art, and was classified as National Monument since its discovery in 1963. Despite its unique features, the site was not continuously used by hunter-gatherers. After the end of its long use during the Palaeolithic, the cave was abandoned, regaining its symbolic importance only several thousand years later with the placement of the dead in its underground space by Neolithic farmers, being largely ignored by Mesolithic hunter-gatherers.

The use of natural caves in south-western Iberia by Mesolithic hunter-gatherers is well attested in other regions (ARAÚJO, 2016), but open-air sites were preferred for the placement of the dead during this phase (PEYROTEO STJERNA, 2016). In contrast, the oldest evidence of Neolithic funerary practices in south-western Iberia was identified in caves (e.g. BOAVENTURA, 2009; ZILHÃO, 1992). Neolithic human remains are relatively abundant in the karst landscapes of Portuguese Estremadura and coastal Alentejo. In Estremadura, one of the most remarkable sites is Algar do Bom Santo Cave (CARVALHO, 2014), and like Escoural it was sealed until its discovery, preventing the disturbance of original contexts

by post-Neolithic occupations. In this context, the Escoural Cave stands out as exceptional because of 1) the preservation of articulated human remains in association with material culture, such as complete vessels, offers a unique opportunity to investigate Neolithic funerary practices;

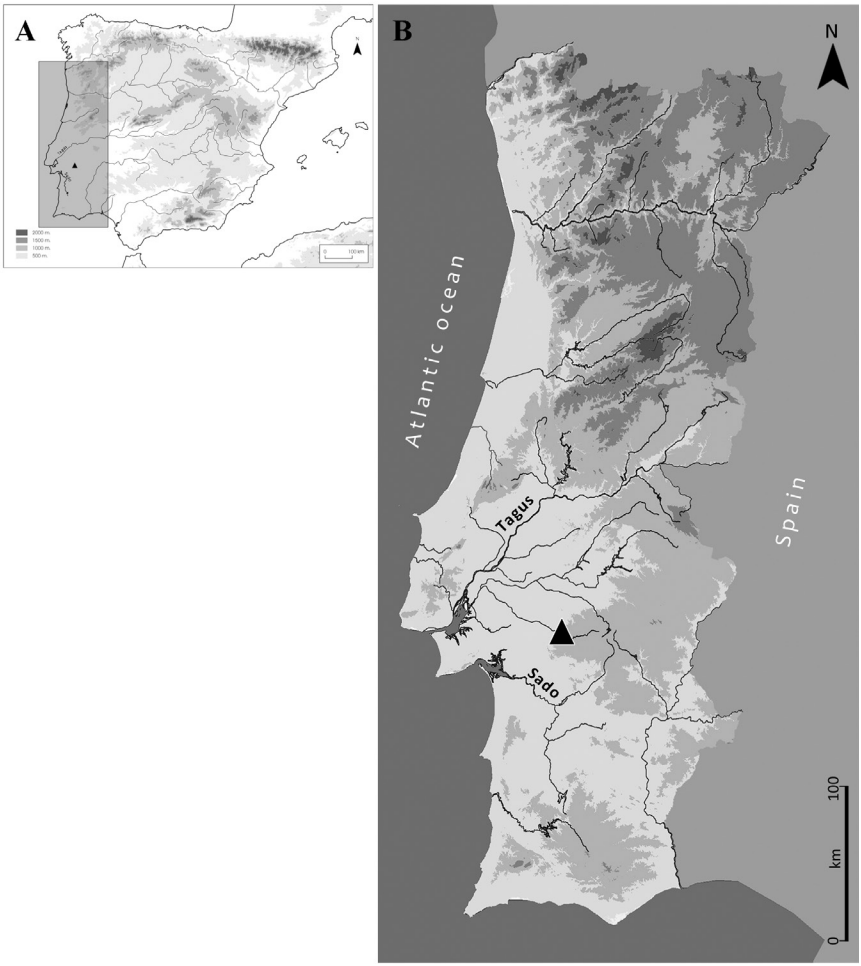

Figure 1. Location of the Escoural Cave, Montemor-o-Novo, Portugal, in the context of Iberia (A) and Portugal (B).

2) the outstanding bone preservation (human remains, bone artefacts) provided by the karst environment is in contrast with the surrounding region where acidic soils inhibit organic preservation; 3) it is one of the few interior locations in south-western Iberia with cardial pottery (e.g. DINIZ, 2007; ZILHÃO, 1992) – an exogenous ware introduced in Iberia by early farmers of Mediterranean origin c. 5400 BCE (ZILHÃO, 2001); 4) current radiocarbon data show intensive funerary use of the cave c. 3500 – 3000 BCE (ARAÚJO & LEJEUNE, 1995), while megalithic tombs were built in the region for the same function (BOAVENTURA, 2009); 5) despite the late chronology of the dated human remains, the material culture parallels for the most part with Middle Neolithic contexts, such as Algar do Bom Santo c. 3800 – 3400 BCE (CARVALHO, 2014).

The cave was surveyed and excavated in 1963–1968 and 1989–1992, while a project dedicated to the study of the rock art took off in 1977 (ARAÚJO, 1995a; SANTOS et al., 1980). Most of the archaeological material was excavated in the 1960s but the results were sparsely published and focused on selected artefacts (SANTOS, 1967a, b). In 1989–1992, A. C. Araújo and colleagues inventoried and examined for the first time the material excavated in the 1960s. The resulting monograph (ARAÚJO & LEJEUNE, 1995) presented an overview of the main finds and is the only comprehensive work about the Neolithic use of the cave, and was followed by the first attempt to address issues related with the funerary ritual practices (CAUWE, 1996). Thus, more than 50 years after its discovery, Escoural's Neolithic population remains unknown. Standard analyses of the human skeletons remain to be done, such as estimate of the number of individuals, biological profile, or reconstruction of funerary practices. Moreover, the Neolithic activity in the cave intersecting key periods in the process of establishing the farming lifeway can be further explored, such as the penetration of pioneer farmers from the coast to the interior, as suggested by the cardial pottery in the cave, or the development of farmer groups in south-western Iberia using multiple architectures for the dead (e.g. caves, megalithic tombs of various types) suggesting a complex Neolithic ideology.

The aim of this paper is to present a synthesis of what is known about the Neolithic use of the cave complemented by new observations in the scope of the ongoing project for the Escoural Cave started in 2018.

2. WHAT'S IN THE CAVE?

The Escoural Cave was identified in April-17, 1963 during stone mining work (SANTOS, 1964) as described in several documents in the archives of the National Museum of Archaeology (*MNA/ Museu Nacional de Arqueologia, APMH/Arquivo Pessoal Manuel Heleno*).

Human crania and complete ceramic vessels were exposed on the floor of the cave, attracting the attention not only of the local population but also of the national newspapers who reported the discovery as extraordinary (MNA/APMH/6/1/4/1). Original documentation in the museum's archives (MNA/APMH/2/3/1/1) indicate that excavations started shortly after its discovery in April-28 by a small group of experienced field workers from the museum (Jaime Pereira Roldão, Dario de Sousa), later accompanied by the archaeologist Manuel Farinha dos Santos. Initial work was focused on documenting what was perceived as distinct concentrations of human remains and artefacts lying on the surface (photography, drawings), as well as securing the entrance of the cave, and recovering artefacts removed from the cave by locals.

The exterior of the cave was also occupied during prehistoric times suggesting an understanding of the ancestry of the place as demonstrated by the chrono-cultural succession of archaeological remains. A Chalcolithic fortified settlement was built on top of the hill above the cave (GOMES, R.V. *et al*., 1983; GOMES *et al*., 2012–2013), as well as a megalithic tomb for the collective placement of the dead, tholos (SANTOS, 1967a; SANTOS & FERREIRA, 1969) – a type of monument generally dated to c. 3000 – 2500/2750 BCE, Late Neolithic/Chalcolithic (BOAVENTURA *et al.*, 2014). An engraved outcrop was found under the structures of the settlement possibly dated to the Late Neolithic due to its stratigraphic position (GOMES, M. V. *et al.*, 1983; 1994). Additionally, one human burial was excavated in the exterior of the cave at the south-eastern entrance, but its chronology remains unclear (ARAÚJO, 1995a, p. 16, 22; SANTOS, 1971). Lithic material and abundant Pleistocene fauna dated to the Middle Palaeolithic were excavated in the cave in 1989–1992 (OTTE & SILVA, 1996). However, spatial distribution analyses demonstrated that this material was originally accumulated in the exterior of the cave and was transported to the interior by post-depositional events. The secondary position of artefacts found in the interior of the cave was observed in other areas,

such as in the archaeological context with impressed ceramics and other artefacts of Early Neolithic chronology found in the exterior and interior of the cave, which due to taphonomic processes became part of the filling of the cave (ARAÚJO, 1995a, p. 22; 1995b, p. 53).

Despite the large number of well-preserved Neolithic human remains and artefacts found in the cave, the research has been traditionally focused on the Palaeolithic rock art (LEJEUNE, 1995; GLORY *et al.*, 1966; GOMES *et al*., 1990; OTTE & SILVA, 1996; SANTOS, 1964; 1967b; SANTOS *et al*., 1980; SILVA *et al*., 2017).

2.1 Archaeological material in Neolithic context

The cave is made up of a network of several galleries in three distinct levels. The most important archaeological sector consists of a large room located immediately after the current entrance (room 1, *sala 1*), and connected galleries. The archaeological material associated with the funerary use of the cave during the Neolithic was mostly found on the floor of the cave, concentrated in room 1 and distributed along the galleries (6, 7, and 11) (Fig. 2). Most material was completely or partially covered with calcite, and in extreme cases the funerary deposits containing human remains and artefacts became sealed under this layer (Fig. 3).

Archaeological material consists of human remains, bone and stone artefacts, pottery, personal adornments, and other remains (ARAÚJO & LEJEUNE, 1995) (Fig. 4). The material is curated by MNA, although selected assemblages are on display in local exhibitions at Centro Interpretativo da Gruta do Escoural and Museu dos Amigos de Montemor-o-Novo.

The *human remains* excavated in the cave consist of complete and associated skeletons (Fig. 3), as well as disarticulated bones, commingled, and scattered elements, at different levels of preservation. A number of skeletons retained their anatomical topography and are in association with artefacts such as ceramic vessels (ARAÚJO, 1995a; CAUWE, 1996). These are clear examples of deposits in primary position, where the bodies were placed on the floor of the cave after death while still retaining their anatomical integrity. Often, the bones were found scattered in secondary position. While in some instances scattering could be explained by taphonomic processes, in other cases it suggests post-depositional manipulation of the cadavers, such as in the case of the crania found in niches (ARAÚJO, 1995a; CAUWE, 1996). Secondary manipulation of

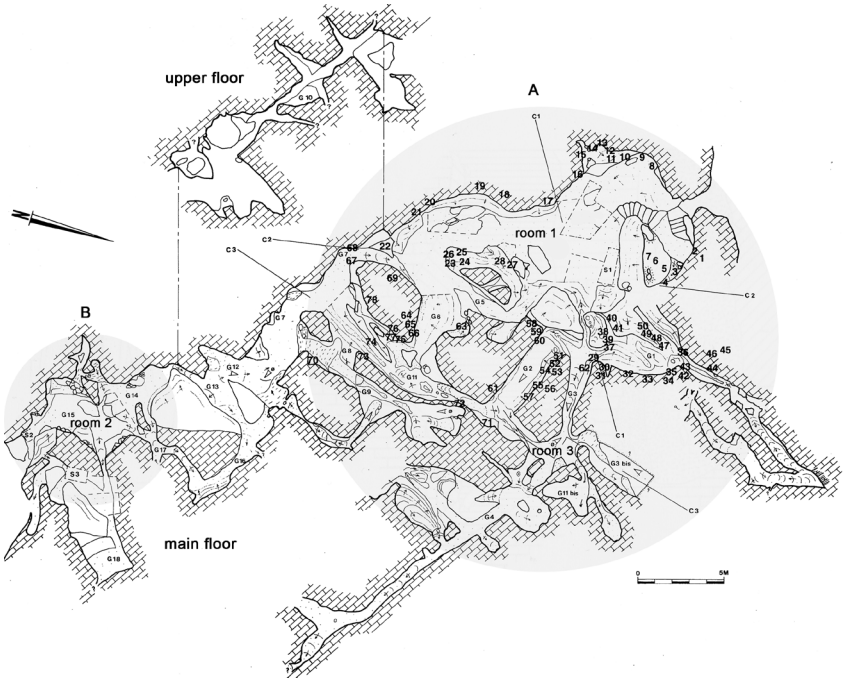

Figure 2. Plan of the Escoural Cave, main and upper floors. Shade: highlights the archaeological areas with (A) Palaeolithic rock art, Early and Late Neolithic remains, (B) Middle Palaeolithic, Early Neolithic remains. G: gallery. Numbers 1–77: indicate locations with rock art. Adapted from ARAÚJO & LEJEUNE, 1995.

human remains could also be explained by the practice of reduction, entailing the removal of the remains of a previous deposit to give place to new individuals.

At present, the human osteological collection is considered to be of Neolithic chronology and there are no contextual or typological elements suggesting otherwise. The collection remains to be studied, although some specimens were analysed from an osteometric perspective (ISIDORO, 1981). Preliminary estimates of the minimum number of individuals (MNI) suggest that more than 50 individuals were placed in the cave after death (Cidália Duarte, pers. comm.).

The *bone industry* consists of a small assemblage of bone points (n=18)

Figure 3. Human remains in association with material culture covered with calcite. Excavated in 1963 in the Escoural Cave and curated at the National Museum of Archaeology, Lisbon. Reproduced with permission. Copyright © José Pessoa, ADF, Arquivo de Documentação Fotográfica, DGPC.

Figure 4. Example of archaeological material excavated in the 1960s in the Escoural Cave. Reproduced with permission. Copyright © José Pessoa, ADF, Arquivo de Documentação Fotográfica, DGPC.

mostly made from long bones of ovicaprid species. At least one point was carved from a red deer bone (*Cervus elaphus*) and was engraved with incisions. The study of this material is limited to preliminary description which includes location of the artefacts in the cave and individual drawings (ARAÚJO *et al*., 1995).

Lithic industry consists of knapped and polished stone tools. Preliminary description, drawings and the location of the finds in the cave has been published (ARAÚJO *et al*., 1995). Stone tools were knapped from non-local flint and consist of a relatively homogeneous groups of blades (n=34), knapped by indirect percussion, and pressure in some cases, and microliths made from elongated blanks (geometric trapezes, n=12). The assemblage contains three cores: one prismatic for blades (flint), one bipolar for bladelets (hyaline quartz), and one interpreted as a possible scrapper (hyaline quartz). The assemblage of polished stone tools is composed by axes (n=6), adzes (n=10), and chisels (n=3). Macroscopic observation of the material suggests that most of these artefacts were not used (ARAÚJO *et al*., 1995). Other stone artefacts include polishers (n=3), and a sharpener (n=1) covered with red ochre. Preliminary analysis indicates a non-local provenance of the raw material.

Pottery in Escoural is composed by several complete or almost complete vessels. However, most of the assemblage consists of a large number of plain fragments. For this reason it has been difficult to estimate the number of vessels (ARAÚJO et al., 1995). First analyses of the assemblage (ARAÚJO et al., 1995) indicate that clay matrices were homogenous, and surfaces were smoothed out and often polished. Vessel shape types include globular (19–23 cm in diameter), small globular (10–12 cm in diameter), oval mouth (9–16 cm in diameter), bowls, and a few carenated bowls. Some vessels have elements of suspension such as handles, *mamelon*, and plastic cordons. The few decorated fragments found in the cave were decorated with impressed techniques. Among these are the fragments with impressed cardial (n=9) which were found scattered in room 1 and seem to belong to one globular vessel (ARAÚJO, 1995b). Other impressed ware was found in the exterior of the cave at the south-eastern entrance as well as in the interior but in secondary position (see above). One group of impressed fragments (n=8) seem to belong to one large globular vessel with narrow opening. The second

group of impressed ware (n=2) consists of one handle of a globular vessel and were found in the exterior of the cave.

Personal adornments were made of bone, stone and shell (ARAÚJO *et al*., 1995). The assemblage consists of bone (n=5) and stone (n=10) beads, one hair pin made of bone (SANTOS *et al*., 1991), a bracelet made from shell of dog cockle (*Glycymeris* sp.), and coin shaped objects (n=3) made from common cockle shell (*Cerastoderma edule)*.

Other objects found in the cave include one fragment of a ceramic spoon, and a fragment of what could be the base of a polished limestone object. Two perforated sandstone plaques (SANTOS, 1971) are among the archaeological collection but the context of their excavation is unclear (ARAÚJO *et al*., 1995, p. 72).

Other remains found in the cave in association with archaeological material include a few large scallop shells (*Pecten* sp.), mussels (*Mytilus edulis*), and oysters (*Ostrea* sp.), as well as pebbles of various sizes foreign to the cave environment. Red ochre, charcoal and burnt sediments were also largely documented and collected during the 1960s excavations.

2.2 Radiocarbon dates

Radiocarbon (^{14}C) measurements on archaeological material found inside the cave were carried out in 1989–1995 (ARAÚJO & LEJEUNE, 1995). Samples consisted of human bone collected in 1989 (n=4) and in 1964 (n=1) (Table 1). One sample revealed poor quality during laboratory analysis and the measurements were rejected (human tibia, 1963, gallery 7, group 18, OxA–4444: 5560 ± 160 BP) (MONGE SOARES, 1995, p. 111).

The oldest dates on human bone collagen from the Escoural Cave are represented by two individuals in room 1 and gallery 4 (G.4.3) with a posterior density estimate for the time of burial of 3618 – 3102 cal BCE (95% *probability*) and 3506 – 3107 cal BCE (95% *probability*) respectively. The other three ^{14}C dates, obtained from burials found in galleries 4 and 12, cluster in the time span c. 3300 –3000 cal BCE (95% *probability*). The abundant human remains in galleries 6, 7, 11 have not been successfully dated.

Current ^{14}C data predicts the start of the use of the cave for the deposition of the dead to have been 3841 – 3124 cal BCE (95% *probability*; *start of funerary activity*), and its end to have been in 3344 – 2708

cal BCE (95% *probability; end of funerary activity*) (Fig. 5). The activity is estimated to have continued for *between* 0 *and* 506 *years* (95% probability; site use for funerary activity). It is important to emphasize that these boundaries are date estimates which have not been dated directly by ^{14}C measurements and were calculated by OxCal (BRONK RAMSEY, 2009) from the dated human remains of the series. Model boundaries do not depend on any particular ^{14}C date, but on the whole assemblage of considered dates (see BRONK RAMSEY, 2000; 2001). As discussed below, the current dataset has low resolution and new measurements will certainly refine current estimates. At present, Start and End boundaries were predicted based on five dates with relatively large uncertainties and should not be used to define the use of the Escoural Cave for funerary practices. However, while these boundaries must be used with caution, as they do not represent direct dates, they can be used as guidelines to

Year	Location	Stratigraphy	Bone	Lab no.	^{14}C Age BP	Modelled cal BCE *Posterior density estimate (95% probability)*
1989	Gallery 12 (G.12.4)	Upper layer under calcite; in association with fragmented human bones	Femur-R	Lv-1925	4420 ± 60	*3355–2980*
1989	Gallery 12 (G.12.3)	Upper layer under calcite; in association with fragmented human bones	Femur-R, shaft	Lv-1924	4460 ± 70	*3365–3021*
1989	Gallery 4 (G.4.3)	Upper layer under calcite; in association with fragmented human bones, ceramics and *Pecten* shell	Iliac blade-R	Lv-1922	4500 ± 60	*3368–3040*
1989	Gallery 4 (G.4.4)	Upper layer under calcite; in association with fragmented human bones	Tibia-L, shaft	Lv-1923	4610 ± 60	*3506–3107*
1964	Room 1, trench 1	Upper layer	Femur-R, proximal, 983.387.4	ICEN-861	4680 ± 80	*3618–3102*

Table 1. Human bone collagen (5) samples from the Escoural Cave (ARAÚJO & LEJEUNE, 1995).

inform further research and to test hypotheses, allowing refinement of further and more robust chronologies.

3. DISCUSSION

Despite the number of published papers, a monograph, and its status as a National Monument, the use of the Escoural Cave by Neolithic populations and how its use intersects key periods of the neolithisation of the territory are not well understood.

The chronology of the funerary activity in the cave remains an open question, and multilayered intersections of this occupation with key periods in the process of establishing farming lifeway should be investigated.

The Early Neolithic (c. 5500 – 4700 BCE) presence in the cave is attested by impressed pottery but the nature of this occupation and its absolute chronology are unknown. Fragments of impressed cardial ware were

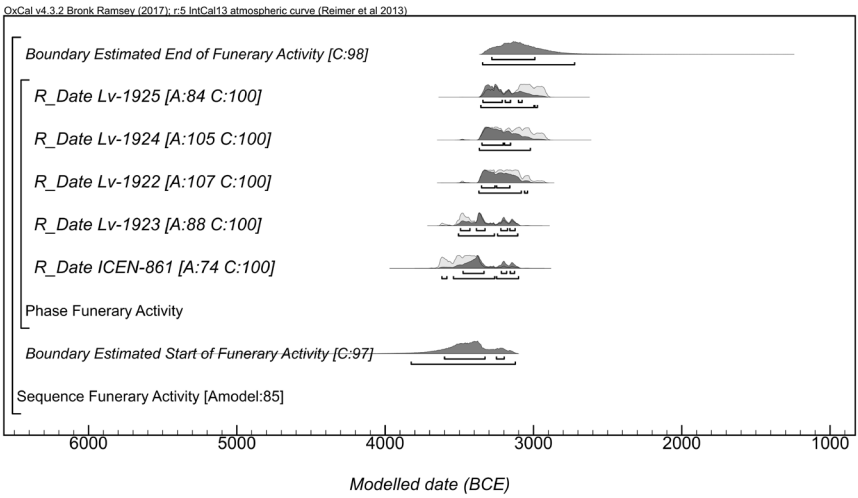

Figure 5. Chronological model for the funerary activity at Escoural Cave based on ^{14}C dates on human bone collagen. Agreement index for each dated event is high (A≥75) and in good convergence (C≥98%). The model shows satisfactory overall agreement (Aoverall=85%) indicating that the ^{14}C dates are in accordance with the prior information incorporated in the model, which does not assume phases and does not impose any relative order to the dated events. Calibrated with OxCal 4.3 (BRONK RAMSEY, 2009) using atmospheric curve IntCal13 (REIMER et al., 2013).

identified in room 1 where most human remains were found, however, its exact provenance and association with funerary deposits is unclear. Whether this ceramic tradition was associated with funerary practices, or with other uses of the cave during the Early Neolithic, can only be tested by a systematic 14C dating programme of the human remains in the various sections of room 1 and galleries. Testing the hypothesis of the use of the cave by early farmers as a place for the dead is particularly relevant because while Early Neolithic settlements are well known in the region (e.g. Valada do Mato, c. 10 km NE from the cave, DINIZ, 2007) the places for the dead remain unidentified.

Current radiometric chronology is based on human bone remains found in room 1 (n=1) and in galleries 4 (n=2) and 12 (n=2). While these results are coherent with the funerary use of the cave during one main phase, further dates may refine this chronology in terms of additional phases masked by the limited number of dates.

The material culture, i.e. plain globular pottery, axes, adzes and chisels, small blades and trapezes, and personal adornments such as the Pecten bracelet, suggest that the main phase of funerary activity in the cave was during the Middle Neolithic (c. 4500 – 3500 BCE, NEVES & DINIZ, 2014). However, the oldest dated human remains are more recent (ICEN-861, Lv-1923), ranging from c. 3600 to 3100 cal BCE (95% confidence), suggesting either that the Middle Neolithic human remains have not been directly dated yet, and/or that the artefactual tradition associated with the Middle Neolithic persisted for a longer period of time, at least in funerary contexts, indicating conservatism and continuity in the Escoural Cave. The other available dates (Lv-1925, Lv-1924, Lv-1922), collected from individuals placed in different areas of the cave, cluster in the time span between 3300 and 3000 cal BCE. This Late Neolithic chronology is at odds with the bulk of the material culture, which parallels with Middle Neolithic contexts elsewhere. Although current estimates of the start and end of the funerary activity in the cave must be interpreted with caution, these highlight issues requiring further investigation. At present, there are no burials dated after c. 3300 – 3000 cal BCE. However, the extended end boundary predicted by the model (c. 3300 – 2700 cal BCE) may be plausible as it accommodates the typically later temporal framework attributed to a few artefacts also found in the cave, such as the carena-

ted vessels, perforated sandstone plaques (n=2), and a fragment of polished limestone object ("idol"?). In the context of the whole assemblage, these elements are low in number and the context of excavation of these artefacts is not clear, however, the hypothesis of a later use of the cave must be investigated, and further 14C dating should provide direct data to confirm or reject this hypothesis. Understanding the use of the cave during the Neolithic may become more complex, but better defined, as more ^{14}C measurements become available securely dating human activity over time. To investigate these intricacies, we need a dataset with greater resolution. This includes new dates with smaller uncertainties representative of the s-patial distribution of the funerary depositions in the cave, allowing to effectively investigate when the funerary activity started and when it ended, as well as to estimate the frequency of mortuary depositions in the cave.

Analysis of the archaeological assemblage in the Escoural Cave raises several important issues for the research on Neolithic population interaction and funerary practices. Firstly, the material culture associated with Middle Neolithic funerary practices in natural caves seems to suggest at least two cultural traditions: i) a phase and/or tradition defined by the presence of flaked and polished stone tools such as blades, trapezes, axes and adzes, personal adornments on shells, such as *Glycymeris* bracelets, and few pottery vessels – largely based on recent research in Algar do Bom Santo Cave, c. 3800 – 3400 cal BCE (CARVALHO, 2014); ii) a phase and/or tradition characterized by the same votive package outlined above but with an important ceramic component, such as plain globular vessels in association with the dead, as observed in the Escoural Cave, which chronology remains to be refined. Whether these traditions are the result of different chronological phases or co-existing practices remains an open question.

Secondly, the Escoural Cave was used as a funerary space while several megalithic architectures of funerary and non-funerary nature (e.g. dolmens, menhirs, stone circles) emerged in the area (c. 3600/3500 – 3000 cal BCE, BOVENTURA, 2009), raising interesting questions about socio-cultural diversity and interaction during the Neolithic. After death, while some individuals were placed in the Escoural Cave, others were placed in dolmens, or other megalithic structures. Escoural is the only cave in the interior of Alentejo, and even though its use for funerary practices may seem odd in a landscape po-

pulated by megalithic architectures, this was common practice since the Early Neolithic in the cave rich limestone areas of Estremadura. Natural caves, such as Escoural, were possibly prioritized by Neolithic populations for the placement the dead (BOAVENTURA, 2009). Thus, to understand this particular place it is important to establish the origins of Escoural's population, as well as to investigate contemporary funerary practices in relation with choice of containers (e.g. cave, megalithic structures). The main question that remains to be answered is: who were the people placed in the Escoural Cave after death? Were these people from a local population using the cave as a funerary space, or from non-local groups deliberately choosing the single natural cave in the area to reproduce a *foreign* funerary tradition? Or, were the dead at Escoural Cave an admixture of local and non-local groups performing and re-interpreting funerary traditions?

4. FURTHER WORK

The funerary context in the Escoural Cave offers a unique research opportunity for in-depth analysis of how early farmers treated the dead; to establish more accurate chronotypologies for the Neolithic; for high--resolution physical and biochemical analyses of Neolithic remains (human bone, artefacts); to examine sociocultural and biological interaction within early farmer groups, as well as with past hunter-gatherer populations.

The key questions which need to be addressed are: 1) Who was placed in the Escoural cave after death? 2) Can we distinguish between farmer groups at biological and sociocultural levels? 3) Was the cave used by pioneer farmers for funerary practices? If so, how did these first farmers adapt to a new landscape and interact with local hunter-gatherers?

Traditional archaeological methods alone have not been able to resolve these questions. The aim of the current projected focused on the Escoural Cave is to implement an integrated interdisciplinary, high-resolution approach to understand human interaction at the onset and establishment of new lifeways in south-western Iberia (c. 5400 – 3000 BCE) through the explicit application of archaeological science to archaeology of death. The dead at Escoural must be examined in terms of time, population, and practice by integrating several scales of analysis: osteoarchaeology, genomics, palaeodiet and subsistence, mobility, funerary practices, ma-

terial culture and chronological framework. With this approach we aim to provide new knowledge from the exceptional archaeological assemblage already excavated in the Escoural Cave, contributing with new value to the museum collections of this National Monument.

ACKNOWLEDGMENTS

The Markus Borgström Grant, Uppsala University for funding this research, the National Museum of Archaeology (MNA) for providing access and facilities to study the Escoural collection, and the National Archive of Photographic Documentation (*Arquivo de Documentação Fotográfica da DGPC*) for permission to reproduce photographic material.

REFERENCES

ARAÚJO, Ana Cristina (1995a) – O Sítio. In ARAÚJO, Ana Cristina; LEJEUNE, Marylise eds. – Gruta do Escoural: necrópole neolítica e arte rupestre paleolítica. Lisboa: IPPAA, pp 12–34. (Trabalhos de Arqueologia 8).

ARAÚJO, Ana Cristina (1995b) – O Neolítico Antigo. In ARAÚJO, Ana Cristina; LEJEUNE, Marylise eds. – Gruta do Escoural: necrópole neolítica e arte rupestre paleolítica. Lisboa: IPPAA, pp. 51–56. (Trabalhos de Arqueologia 8).

ARAÚJO, Ana Cristina (2016) – Une histoire des premières communautés mésolithiques au Portugal. Oxford: BAR International Series 2782.

ARAÚJO, Ana Cristina, LEJEUNE, Marylise (1995) – Gruta do Escoural: necrópole neolítica e arte rupestre paleolítica. Lisboa: IPPAA. (Trabalhos de Arqueologia 8).

ARAÚJO, Ana Cristina; CAUWE, Nicolas; SANTOS, Ana Isabel (1995) – A Necrópole Neolítica (Estudo das Colecções das Antigas Escavações). In ARAÚJO, Ana Cristina; LEJEUNE, Marylise eds. – Gruta do Escoural: necrópole neolítica e arte rupestre paleolítica. Lisboa: IPPAA, pp 57–109. (Trabalhos de Arqueologia 8).

BOAVENTURA, Rui (2009) – As antas e o Megalitismo da região de Lisboa. Lisboa: Universidade. Unpublished PhD dissertation.

BOAVENTURA, Rui; FERREIRA, Maria Teresa; NEVES, Maria João; SILVA, Ana Maria (2014) – Funerary practices and Anthropology during Middle-Late Neolithic (4th and 3rd millennia BCE) in Portugal: old bones, new insights. Anthropologie. LII/2, pp. 183–205

BRONK RAMSEY, Christopher (2000) – Comment on the use of Bayesian statistics for 14C dates of chronologically ordered samples: a critical analysis. Radiocarbon. 42 (2), pp.199–202.

BRONK RAMSEY, Christopher (2001) – Development of the radiocarbon dating program. Radiocarbon. 43 (2A), pp. 355–363.

BRONK RAMSEY, Christopher (2009) – Bayesian analysis of radiocarbon dates. Radiocarbon. 51 (1), pp. 337–360.

CARVALHO, António Faustino (2014) – Bom Santo Cave (Lisbon) and the Middle Neolithic societies of Southern Portugal. Faro: Universidade do Algarve. (Promontoria

Monográfica 17).
CAUWE Nicolas (1996) – La nécropole de la grotte d'Escoural (prov. d'Evora, Portugal): essai d'interprétation des rites funéraires. In OTTE, Marcel ; SILVA, António Carlos eds. – Recherches préhistoriques à la grotte d'Escoural, Portugal. Liège: Université de Liège, Service de Préhistoire, pp. 287–311. (ERAUL 65).
DINIZ, Mariana (2007) – O sítio da Valada do Mato (Évora): aspectos da neolitização no interior/Sul de Portugal. Lisboa: IPA. (Trabalhos de Arqueologia 48).
DINIZ, Mariana; NEVES, César; MARTINS, Andreia (2016) – Sociedades neolíticas e comunidades científicas: questões aos trajectos da História. In DINIZ, Mariana; NEVES, César; MARTINS, Andreia eds. – O Neolítico em Portugal antes do Horizonte 2020: perspectivas em debate. Lisboa: Associação dos Arqueólogos Portugueses, pp.131–153. (Monografias da AAP 2).
GLORY, André; VAULTIER, Maxime; SANTOS, Manuel Farinha dos (1966) – La grotte ornée d'Escoural (Portugal). Bulletin de la Société préhistorique française. Paris. 62 (1), pp. 110–17.
GOMES, Mário Varela; CARDOSO, João Luís; SANTOS, Manuel Farinha dos (1990) – Artefactos do Paleolítico superior da Gruta do Escoural (Montemor-o-Novo, Évora). Almansor. Montemor-o-Novo. 8, pp. 15–36.
GOMES, Mário Varela; GOMES, Rosa Varela; SANTOS, Manuel Farinha dos (1983) – O Santuário exterior do Escoural. Sector NE (Montemor-o-Novo, Évora). Zephyrvs. 36, pp. 287–307.
GOMES, Mário Varela; GOMES, Rosa Varela; SANTOS, Manuel Farinha dos (1994) – O Santuário exterior do Escoural. Sector SE (Montemor-o-Novo, Évora). In Actas das V Jornadas Arqueológicas. Lisboa: AAP, pp. 93–108.
GOMES, Mário Varela; NINITAS, João; Borralho, Rita (2012–2013) – Artefactos líticos do povoado calcolítico do Escoural (Montemor-o-Novo). Almansor. Montemor-o-Novo. 10, pp. 5–60.
GOMES, Rosa Varela; GOMES, Mário Varela; SANTOS, Manuel Farinha dos (1983) – Santuário exterior e povoado calcolítico do Escoural. Clio Arqueologia. Lisboa, 1. pp. 77–78.
ISIDORO, Agostinho Farinha (1981) – Espólio ósseo humano da Gruta Neolítica do Escoural, Trabalhos de Antropologia e Etnologia. Porto. XXIV (1), pp. 5–46
LEJEUNE, Marylise (1995) – L'Art Parietal de La Grotte D' Escoural. In ARAÚJO, Ana Cristina; LEJEUNE, Marylise eds. – Gruta do Escoural: necrópole neolítica e arte rupestre paleolítica. Lisboa: IPPAA, pp 123–233. (Trabalhos de Arqueologia 8).
MONGE SOARES António (1995) – Datação absoluta da necrópole "neolítica" da Gruta do Escoural. In ARAÚJO, Ana Cristina; LEJEUNE, Marylise eds. – Gruta do Escoural: necrópole neolítica e arte rupestre paleolítica. Lisboa: IPPAA, pp. 111–119. (Trabalhos de Arqueologia 8).
NEVES, César; DINIZ, Mariana (2014) – Acerca dos cenários da acção: estratégias de implantação e exploração do espaço nos finais do 5º e na primeira metade do 4º milénio A.C. no sul de Portugal. Estudos do Quaternário. Braga: APEQ. 11, pp. 45–58.
OTTE, Marcel; SILVA, António Carlos (1996) – Recherches préhistoriques à la grotte d'Escoural, Portugal. Liège : Université de Liège, Service de Préhistoire. (ERAUL 65).
PEYROTEO STJERNA, Rita (2016) – Roots of death: origins of human burial and the research on Early Holocene mortuary practices in the Iberian Peninsula. In GRÜNBERG,

Judith; GRAMSCH, Bernhard; LARSSON, Lars; ORSCHIEDT, Jörg; MELLER, Harald eds. – Mesolithic burials – Rites, symbols and social organisation of early postglacial communities. Halle (Saale) : Tagungen des Landesmuseums für Vorgeschichte Halle, pp. 629–643. (Band 13/II).

REIMER, Paula J.; BARD, Edouard; BAYLISS, Alex; BECK, J. Warren; BLACKWELL, Paul G.; RAMSEY, C. Bronk; BUCK, Caitlin E.; CHENG, Hai; EDWARDS, R. Lawrence; FRIEDRICH, Michael; GROOTES, Pieter M.; GUILDERSON, Thomas P.; HAFLIDASON, Haflidi; HAJDAS, Irka; HATTÉ, Christine; HEATON, Timothy J.; HOFFMANN, Dirk L.; HOGG, Alan G.; HUGHEN, Konrad A.; KAISER, K Felix; KROMER, Bernd; MANNING, Sturt W.; NIU, Mu; REIMER, Ron W.; RICHARDS, David A.; SCOTT, E. Marian; SOUTHON, John R.; STAFF, Richard A.; TURNEY, Christian S. M.; VAN DER PLICHT, Johannes (2013) – IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0–50,000 Years cal BP. Radiocarbon. 55(4). pp. 1869–1887.

SANTOS, Manuel Farinha dos (1964) – Vestígios de pinturas rupestres descobertos na Gruta do Escoural. O Arqueólogo Português. Lisboa. 2(5), pp. 5–47.

SANTOS, Manuel Farinha dos (1967a) – A necrópole de tipo "tholos" de Santiago do Escoural. O Arqueólogo Português. Lisboa. 3(1), pp. 107–13.

SANTOS, Manuel Farinha dos (1967b) – Novas gravuras rupestres descobertas na Gruta do Escoural. Revista de Guimarães. Guimarães. 72, pp 18–34.

SANTOS, Manuel Farinha dos (1971) – Manifestações votivas da necrópole da Gruta do Escoural. In Actas do II Congresso Nacional de Arqueologia. Coimbra: Ministério da Educação Nacional, vol. I, pp. 95–97

SANTOS, Manuel Farinha dos; FERREIRA, Octávio da Veiga (1969) – O monumento eneolítico de Santiago do Escoural. O Arqueólogo Português. Lisboa. 3(3), pp. 37–62.

SANTOS, Manuel Farinha dos; GOMES, Mário Varela; CARDOSO, João Luís (1991) – Dois artefactos de osso, pós-paleolíticos, da Gruta da Escoural (Montemor-o-Novo, Évora). Almansor. Montemor-o-Novo. 9, pp. 75–94

SANTOS, Manuel Farinha dos; GOMES, Mário Varela; MONTEIRO, Jorge Pinho (1980) – Descobertas de arte rupestre na Gruta do Escoural. In Altamira Symposium. Madrid: Ministerio de Cultura, Subdirección General de Arqueología. pp. 205–242.

SILVA, António Carlos; MAURAN, Guilherme; ROSADO, Tânia; MIRÃO, José; CANDEIAS, José; CARPETUDO, Carlos; CALDEIRA, Ana Teresa (2017) – A arte rupestre da Gruta do Escoural: novos dados analíticos sobre a pintura paleolítica. In Arqueologia em Portugal, 2017: estado aa questão. Lisboa: Associação dos Arqueólogos Portugueses, pp. 1003–1019.

ZILHÃO, João (1992) – Gruta do Caldeirão. O Neolítico Antigo. Lisboa: IPPAA. (Trabalhos de Arqueologia 6).

ZILHÃO, João (2001) – Radiocarbon evidence for maritime pioneer colonization in the Iberian Peninsula. Proceedings of the National Academy of Sciences. 98(24), pp.14